

CLIMATOLOGICAL DATA FOR APRIL, 1911.

DISTRICT No. 4, LAKE REGION.

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GENERAL SUMMARY.

With the exception of the Lake Superior region, the temperature of April, 1911, in climatological district No. 4 was rather severer than usual, but the mean values were within the limits of the previous decade of years. The prevailing low temperatures and the frequent frosts over the southern and eastern portions of the district served to prevent germination of seeds and to retard development of buds until the change to the pronounced warmth of the last week, when vegetation of all kinds advanced rapidly in growth. In the extreme eastern sections, while the temperatures were, on the whole, below the normal, yet the general seasonal advance, together with the warm spells of the middle and latter portions of the month, brought about conditions favorable for the maple sugar industry, the operation of which had been seriously hampered by the previous cold, as noted in the report for March.

In the extreme northern and eastern portions of the district, less precipitation occurred during the month than in any previous April of the past 10 years; but, because of the water resulting from the melting snows of the preceding months, and the timely occurrence of the precipitation which fell in the course of the period, the deficiency was not so noticeable as would otherwise have been the case. The amount of cloudiness was greatest over the southern portions of the upper Lake region—averaging in that section about 13 cloudy days for the month—and decreased rapidly toward the drier regions in the north and northeast.

The following table summarizes the chief features of meteorological interest in the various portions of the district:

States, portions of which lie within district No. 4.	Mean.									
	Temperature.	Departure from normal.	Precipitation.	Departure from normal.	Snowfall.	Precipitation.	Number of days—	Prevailing wind direction.		
							Clear.	Partly cloudy.	Cloudy.	
Minnesota.....	39.1	-0.1	1.14	-1.03	5.6	6	12	10	8	se.
Wisconsin.....	41.8	-0.6	1.90	-0.67	4.4	8	14	8	8	se.
Illinois.....	46.1	+0.2	3.03	+0.15	2.4	14	10	5	15	ne.
Indiana.....	46.5	-2.0	4.24	+1.38	2.9	13	13	4	13	nw.
Upper Michigan.....	38.9	+0.9	0.83	-1.27	2.8	5	15	6	9	w.
Lower Michigan.....	42.8	-0.5	2.47	+0.20	1.6	8	13	7	10	nw.
Ohio.....	46.5	-1.4	3.84	+1.18	2.2	13	10	8	12	ne.
Pennsylvania.....	44.6	-0.1	2.47	+0.07	2.3	13	10	10	10	w.
New York.....	39.4	-0.9	1.41	-1.05	4.0	8	14	9	7	nw.
Vermont.....	39.6	-2.5	0.87	-1.06	6.1	5	12	10	7	n.

TEMPERATURE.

Throughout the Upper Michigan Peninsula the mean temperature of the month averaged nearly a degree above the normal, but elsewhere there was a deficiency. Over

the southern portions of the district the departure from the normal ranged between -1° and -2° , and in the extreme eastern sections between -2° and -3° . A deficiency of over 3° occurred in the valleys of the Ottawa and Saguenay Rivers in the lower Canadian Provinces, as well as in the region to the northwest of Lake Superior.

The mean daily range in temperature varied considerably in the different portions of the district, ranging from about 15° to 23° . In the Vermont sections the mean daily range was 23.3° and at Northfield 25.8° , showing a greater daily swing of temperature than has occurred in this region in any previous April of record. Here the daily mean temperatures throughout the greater portion of the month were lower for the season than elsewhere in the Lake region, which fact, together with the unusually small number of cloudy days, explains in a large measure the greater diurnal oscillation of temperature in the Champlain Valley. The absolute range for the month was from 86° at Fayetteville, N. Y., to -12° , the latter reading occurring at two stations, Humboldt, in the Upper Michigan Peninsula, and at Nehasane, N. Y.

The month opened with temperatures far below the seasonal normals in all portions of the district, and during the first three days the coldest weather of the month was experienced. Low temperatures continued until the 8th in the western and until the 12th in the eastern portions, except for a wave of warm weather on the 4th-7th, covering the sections from the eighty-fifth meridian to Vermont. This warm spell was occasioned by the southerly sweep of winds in advance of an atmospheric depression of considerable magnitude which passed across the Lower Michigan Peninsula from the southwest, thus affecting the eastern sections only. On the 15th-17th cold weather was again general, continuing over the Champlain watershed and northern Adirondacks until the 25th, and extending over the region south of the lake chain during the 22d-24th. Between the periods of cold weather mentioned the temperatures were, as a rule, above normal, but the most pronounced period of warmth covered the last five days of the month, when the highest readings in practically all portions of the district were recorded, and departures from the daily normals of from $+10^{\circ}$ to $+17^{\circ}$ were general.

PRECIPITATION.

Precipitation in excess of the normal for the month fell over the southern portions of the upper Lake region, reaching a departure of slightly more than 1 inch in northern Indiana, northern Ohio, and the southwestern counties of Lower Michigan. There was also a small area of excess in the highland region to the northward of the Saginaw River basin. Generally, over the northern and eastern sections there was a deficiency of more than 1 inch in the monthly fall. The total amount for the month received over the portions of the district lying

within New York State, Vermont, and upper Michigan was the least occurring in any April for more than 10 years.

There were four distinct periods of precipitation over the western and middle sections of the district, extending over the 4th-7th, 11th-15th, 18th-22d, and 28th-30th, respectively. In the regions lying east of Lake Erie, however, the second and third of these periods merged into one, while precipitation occurred on the first two days of the month as well and in the last period on the 30th only.

Snow.—The snowfall was somewhat greater than that of the mean for the period 1901-1911 over the Minnesota, Wisconsin, Illinois, Indiana, and Vermont portions of the lake region, and slightly below elsewhere, except in the Upper Michigan Peninsula, where the deficiency reached nearly 5 inches. Most of the snowfall was confined to the first week of the period, except in the highlands of the east, where considerable snow fell on dates later in the month, single falls of 4 inches or more occurring, as follows:

Station.	Amount.	Date.	Station.	Amount.	Date.
Angelica, N. Y.....	Inches.		Ithaca, N. Y.....	Inches.	
Do.....	5.0	9	Nehasane, N. Y.....	5.1	8-9
Perry City, N. Y.....	4.0	16	Syracuse, N. Y.....	4.0	16
Tupper Lake, N. Y.....	4.5	8-9	Wedgewood, N. Y.....	4.0	9
Northfield, Vt.....	4.0	16-17		5.5	8-9
	4.0	9			

At the close of the month the ground was bare, except for the hill and forest sections of upper Michigan and the mountain regions of New York and Vermont. In the latter sections the use of sleighs and sleds was continued through the first decade.

NAVIGATION AND ICE CONDITIONS.

The display of storm warnings on the Great Lakes was resumed on April 10. Navigation between Lakes Michigan and Huron became possible a few days later, and the first boats plying between Superior and Huron passed Sault Ste. Marie on the 22d. Between the lower and upper Lakes there was little activity until the 17th, after which date the number of boats passing through the Detroit River increased steadily. Local navigation, however, had been carried on at many of the harbors in all lakes during practically the entire month.

As a rule the harbors in Lake Superior were free of ice by the end of the second week, although floating ice was observed at Sault Ste. Marie until after the close of the month. In Lake Michigan, Green Bay was clear after the 2d, but the ice in Little Bay de Noquette remained solid until after the 8th, on which date teams were still crossing, although with considerable difficulty. By the 15th it had softened much and was somewhat broken up by the wind, and on the following day an ore boat succeeded in cutting her way into Escanaba. Within the next few days the ice gradually drifted out into the lake.

Ice fields covered the eastern end of Lake Erie during the entire month. Navigation at Buffalo opened on the 18th, and steamers experienced very little difficulty in passing through the fields. There was much ice in Ontario at the beginning of the month, 2 feet of solid ice being reported at Kingston, Ontario, on the 4th. Large fields passed out of the lake during the first half of the period, and ferry boats on the St. Lawrence encountered great difficulty at times in making their crossings.

MISCELLANEOUS.

Rivers.—The excess of precipitation over the southwestern portions of the district during the latter part of the month caused a rise in the waters of most of the rivers therein, but flood stages were not reported from any station. The melting snows and the rains in the extreme east also caused much high water in the various streams, and high stages continued during most of the month. In localities considerable trouble was experienced in such industries as depended upon water power while the breaking up and running of the ice in these streams caused at times much apprehension. In northern New York State some injury to mills, gates, etc., occurred, but no extensive damage has been reported.

Auroras were observed at Escanaba on the 2d; at Oswego on the 9th; at Canton on the 2d, 18th, 19th, 20th, and 21st; and at Northfield on the 1st.

Dense fog occurred at Escanaba on the 12th, 13th, 28th, 29th, and 30th.

Forest fires.—The unusually dry weather during April permitted the outbreak of forest fires during the last week of the month in the southern portion of the Upper Peninsula of Michigan, and considerable smoke was reported in that region on the 27th and 28th.

TABLE 1.—*Climatological data for April, 1911. District No. 4, Lake Region.*

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Sky.				Observers.	
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Number of rainy days, 0.01 inch or more.	Number of partly cloudy days.	Number of cloudy days.	Prevailing wind direction.			
<i>Minnesota.</i>																					
Cloquet.....	Carlton.....	800	40	39.8	-0.2	75	27	8	7	48	1.75	-1.05	0.75	8.6	10	12	6	12	se. ne.	D. P. Tierney.	
Duluth.....	St. Louis.....	1,133	40	38.2	-0.2	64	29	3	1	25	1.09	-1.05	0.48	4.3	10	10	7	13	se. ne.	U. S. Weather Bureau.	
Floodwood.....	do.....	1,257	6																M. H. Schussler.		
Stephens Mine.....	do.....	1,500	4	39.2	-1.3	74	17	-5	1	51	0.80	-1.00	0.50	4.0	3	13	12	5	s. ne.	Oliver Iron Mining Co.	
Two Harbors.....	Lake.....	614	17	37.8	+1.1	59	27	5	1	34	1.22	-1.05	0.60	3.0	3	15	7	9	se. se.	G. W. Watts.	
Virginia.....	St. Louis.....	1,434	17	40.6	+1.1	74	17†	2	1	53	0.86	-1.05	0.50	... 3	10	11	9		Oliver Iron Mining Co.		
<i>Wisconsin.</i>																					
Appleton.....	Outagamie.....	795	10	44.4	+1.4	76	27	15	1	33	1.16	-1.34	0.30	4.2	9	17	7	6	s.	Wm. Thiede.	
Ashland.....	Ashland.....	647	20	40.7	+1.1	80	27	8	1	49	0.54	-1.57	0.23	2.0	4	18	6	6	ne.	Sam Wheeler.	
Bayfield.....	Bayfield.....	635	2	40.0	-	70	27	8	1	37	1.14	-	0.50	5.0	4	14	12	4	ne.	John P. Kiel.	
Cecil.....	Shawano.....	804	13	41.2	-1.6	74	27	8	1	38	1.66	-1.11	0.42	3.5	8	14	12	4	se.	Louis W. Schmidt.	
Fond du Lac.....	Fond du Lac.....	1,293	20	39.8	+0.9	74	27	4	2	42	T.	-2.44	T.	T.	0	15	5	10	nw.	Fred S. Evans.	
Grand River Locks.....	Marquette.....	800	25	43.3	-1.2	76	27	10	7	43	1.43	-0.81	0.48	5.0	9	11	6	13	se.	Geo. W. Marshall.	
Green Bay.....	Brown.....	770	15	44.2	-	73	27	15	7	33	1.68	-0.92	0.50	7.5	9	14	7	9	s.	Jerry Parkinson.	
Iron River.....	Bayfield.....	617	25	43.0	+2.3	75	27	15	1	30	1.43	-1.01	0.49	2.7	10	7	11	12	se.	U. S. Weather Bureau.	
Keweenaw.....	Keweenaw.....	1,096	2	42.4	-	80	27	-7	1	55	2.52	-	0.50	4.6	7	19	0	11	s.	Winfield E. Tripp.	
Manitowoc.....	Manitowoc.....	590	20	39.4	-	60	30	13	1	26	2.14	-	0.61	6.1	7	15	7	8	se.	Eugene V. Kimball.	
Menasha.....	Winnebago.....	616	60	40.8	-1.4	64	30	13	1	21	1.97	-0.52	0.58	5.5	11	12	8	10	se.	Johanna Lups.	
Menomonie Falls.....	Waupeka.....	764	14								1.31	-0.55	0.41	6.0	6	17	6	7	se.	Geo. T. Allison.	
Milwaukee.....	Waukesha.....	842	2	43.2	-	73	27	15	1	30	3.28	-	1.08	2.3	11	18	8	9	se.	Arthur H. Christman.	
New London.....	Milwaukee.....	681	40	42.4	+0.6	68	18	20	1	27	3.62	+0.92	1.04	1.1	12	11	8	11	e.	U. S. Weather Bureau.	
Outagamie.....	do.....	762	15	43.4	-1.9	75	27	11	1	36	1.74	-1.06	0.45	3.0	5	10	7	13	se.	August H. Pape.	
Oconto.....	Oconto.....	590	20	43.0	-0.1	75	27	11	1	34	1.36	-	1.23	0.45	T.	6	13	11	6	ne.	Wm. K. Smith.
Oshkosh.....	Winnebago.....	744	22	43.5	-1.4	76	27	12	1	35	1.93	-0.68	0.60	6.0	4	20	9	1	e.	Evan Vincent.	
Pine River.....	Waushara.....	900	16	43.6	-0.9	75	27	12	7	40	1.73	-0.82	0.66	4.6	6	9	5	5	se.	Geo. H. Carpenter.	
Plum Island.....	Door.....	588	3	39.0	-	57	27†	12	2	28	1.83	-	0.70	6.0	7	15	7	8	se.	Geo. C. Robinson.	
Plymouth.....	Sheboygan.....	843	1	42.2	-	73	27	14	1	33	2.62	-	1.44	5.4	7	13	7	10	se.	Paul O. Feldrappe.	
Port Washington.....	Ozaukee.....	713	18	40.8	-2.3	64	30	16	1	26	3.84	+0.86	0.95	6.0	7	10	10	10	se.	Richard C. Kann.	
Racine.....	Racine.....	633	14	42.0	-2.7	68	18	17	1	31	3.35	+0.85	0.77	2.1	12	13	7	10	se.	Daniel Davis.	
Ripon.....	Fond du Lac.....	935	1	44.8	-	73	27	18	1†	28	1.46	-	0.63	5.0	3	15	6	9	se.	Ripon College.	
Sheboygan.....	Sheboygan.....	831	12	41.0	-1.7	62	30	13	1	22	2.86	+0.51	1.30	13.0	7	17	4	9	se.	Louis C. Meyer.	
Sturgeon Bay.....	Door.....	600	12	39.0	-0.4	62	26	9	1	31	2.36	-	0.91	3.5	7	12	11	7	se.	Adam N. Dier.	
Superior.....	Douglas.....	671	2	36.7	-	54	29	7	1	26	0.90	-	0.40	4.2	6	14	10	6	ne.	Edward B. Banks.	
Waupaca.....	Waupaca.....	857	16	43.0	-1.1	79	27	12	1	47	1.54	-1.12	0.47	4.0	8	10	9	11	se.	James H. Flagg.	
<i>Illinois.</i>																					
Chicago.....	Cook.....	824	41	46.1	+0.2	70	27	27	1	18	3.03	+0.15	0.78	2.4	14	10	5	15	ne.	U. S. Weather Bureau.	
<i>Indiana.</i>																					
Auburn.....	Dekalb.....	874	15	43.3	-3.2	60	27	17	2	38	4.64	+2.11	1.82	...	13	13	3	14	nw.	Mrs. Josie B. Kuhiman.	
Berne.....	Adams.....	849	2	47.5	-	74	27†	21	2	37	5.22	-	1.37	6.5	16	11	9	10	nw.	Henry M. Reusser.	
Elkhart.....	Elkhart.....	801	9	48.4	-	75	27	21	1	31 ^b	4.58	-	1.00	T.	11	13 ^b	5 ^b	9 ^b	ne.	Dr. Miles Medical Co.	
Fort Wayne.....	Allen.....	776	15	47.8	-1.5	76	27	21	2†	43	4.05	+1.11	1.23	4.2	14	10	5	15	sw.	Orion E. Mohler.	
Hammond.....	Lake.....	598	20	46.5	-1.0	73	26†	18	9	40	4.02	+1.19	0.65	0	11	10	7	13	nw.	Carson W. Whitney.	
Howe.....	Lagrange.....	886	6	46.2	-	73	27	21	2	38	3.50	-	1.79	3.0	10	16	1	13	w.	James E. Zook.	
South Bend.....	St. Joseph.....	728	18	45.5	-2.5	72	27	22	2	33	3.78	+1.10	1.19	3.5	14	7	2	11	se.	Henry H. Swaim.	
Whiting.....	Lake.....	606	2	47.0	-	75	29	27	7	26	4.13	-	0.96	3.0	13	14	3	13	ne.	D. H. Boyd.	
<i>Michigan—Upper Peninsula.</i>																					
Baraga.....	Baraga.....	623	9			71	27	-8 ^b	2	55 ^b	0.99	-	0.51	4.0	3	20	0	10	w.	D. S. S. & A. Ry.	
Bergland.....	Ontonagon.....	1,300	4	39.0 ^b	-	82 ^b	27	-8 ^b	2	55 ^b	0.99	-	0.51	4.0	3	12 ^b	9 ^b	7 ^b	nw.	Frank McMonigal.	
Blaney.....	Schoolcraft.....																		Dr. S. S. Hackwell.		
Calumet.....	Houghton.....	1,246	23	38.8	+1.5	69	27	11	1	27	0.69	-1.42	0.40	5.5	6	17	6	7	e.	E. S. Grirson.	
Chatham.....	Alger.....	875	10	36.7	+0.6	75	28	-6	3	40	0.27	-1.61	0.12	2.0	5	13	10	12	s.	U. P. Experiment Sta.	
Deer Park.....	Luce.....	610	10	36.7	-	74	27	-3	3	35	1.35	-	0.35	3.0	13	12	2	12	s.	Mrs. Sara E. McGaw.	
Detour.....	Chippewa.....	585	12	39.0 ^b	-	70 ^b	29	4	1	30	1.75	-	0.80	2.0	4	17	1	12	nw.	Mrs. G. C. Reed.	
Eagle Harbor.....	Keweenaw.....	622	12	37.4	-0.0	73	27	10	3	28	0.62	-1.52	0.40	4.0	5	13	13	4	e.	John Nolen.	
Escanaba.....	Delta.....	612	38	37.9	+0.7	60	13	8	1	25	0.42	-1.65	0.21	0.2	7	17	1	13	w.	U. S. Weather Bureau.	
Ewen.....	Delta.....	1,147	10	38.2	-1.0	75	27	2	2	46	0.45	-1.31	0.30	3.0	3	18	1	11	sw.	W. B. Hatfield.	
Grand Marais.....	Alger.....	610	10																	Mrs. Lena Truell.	
Green.....	Ontonagon.....	622	0																	T. A. Green.	
Houghton.....	Houghton.....	668	10	39.3	+2.5	70	27	10	3	33	0.67	-1.36	0.45	4.2	7	12	11	7	e.	U. S. Weather Bureau.	
Humboldt.....	Marquette.....	1,536	14	37.2	+0.9	75	28	-12	1	45	0.70	-1.05	0.40	3.0	2	16	3	9	w.	D. S. S. & A. Ry.	
Iron Mountain.....	Dickinson.....	1,111	10	43.4	+2.4	80	27†	7	1	45	0.30	-2.41	0.17	0.2	2	19	7	4	nw.	Chapin Mining Co.	
Iron River.....	Iron.....	1,504	14	39.8	+1.3	74	27	-1	2	47	1.10	-2.33	0.50	2.0	4	16	7	11	nw.	Victor D. Lang.	
Ironwood.....	Gogebic.....	1,520	8	41.0	+2.5	74	27	-5	1	41	1.28	-0.38	0.68	4.0	6	20	3	7	s.	Prof. J. V. Branigan.	
Ishpeming.....	Marquette.....	1,536	11	39																	

TABLE 1.—Climatological data for April, 1911. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Observers.				
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmeasured.	Number of rainy days, 0.01 inch or more.	Number of partly cloudy days.	Number of cloudy days.			
<i>Michigan—Lower Peninsula—Continued.</i>																				
Arbela.	Tuscola.	728	15	43.2	-1.4	78	27	9	1	40	2.14	-0.68	0.64	1.0	10	1	16	13	ne.	
Battle Creek.	Calhoun.	822	27	45.7	-1.8	75	27	19	1	35	3.18	+1.02	1.05	T.	9	13	6	11	se.	
Bay City.	Bay.	583	15	38.8	-4.8	77	27	9	2	36	1.15	-1.13	0.40	T.	5	10	4	16	ne.	
Benzonia.	Benzie.	116	15	41.0	-1.0	74	27	13	3	39	1.37	-1.24	0.55	6.0	5	12	6	12	nw.	
Berlin.	St. Clair.	122	22	42.4	-1.6	77	30	6	1	41	2.32	+0.22	0.60	1.6	12	4	16	10	ne.	
<i>Michigan.</i>																				
Big Rapids.	Mecosta.	906	15	42.4	-1.2	76	27	12	2	39	4.05	+1.56	1.33	3.0	9	17	3	10	nw.	
Bloomingdale.	Van Buren.	7	45.1	.....	74	27	18	1	32	2.25	.....	0.58	T.	11	16	1	13	nw.	
Cadillac.	Wexford.	1,293	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cassopolis.	Cass.	903	10	46.1	+0.8	73	27	20	1	39	4.70	+1.51	1.30	1.0	10	17	0	13	nw.	
Charlevoix.	Charlevoix.	610	33	40.3	-0.4	77	26	8	2	37	0	.....	0	4.0	.....	18	2	10	ne.
Charlotte.	Eaton.	7	43.4	.....	80	27	14	1	42	1.03	.....	0.58	0	3	16	5	9	sw.	
Cheboygan.	Cheboygan.	611	21	29.0	-1.2	70	26	8	1	38	1.82	-0.23	0.70	3.0	5	15	8	7	se.	
Clinton.	Lemawee.	830	21	46.4	-0.2	84	26	15	1	54	2.93	+0.48	1.05	T.	9	10	11	9	nw.	
Coldwater.	Branch.	984	14	46.2	-0.3	74	27	20	2	36	3.47	+1.14	1.10	0.5	10	13	5	13	sw.	
Concord.	Jackson.	6	45.0	.....	76	27	14	1	36	2.36	.....	0.63	1.03	0	8	12	14	4	nw.
Croton.	Newago.	685	3	44.0	.....	75	27	17	2	38	4.68	.....	1.02	T.	10	12	12	6	nw.
Detroit.	Wayne.	730	40	46.0	+0.5	71	27	20	2	33	3.23	+0.89	1.38	1.2	12	8	11	11	e.	
Durand.	Shiawassee.	799	4	.....	79 ^a	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	H. J. Tobin.
East Tawas.	Iosco.	590	14	39.4	-1.8	66	30	8	2	30	1.70	-0.66	0.80	3.0	6	20	6	4	w.	
Eloise.	Elmwood.	640	14	45.2	-1.1	73	28	14	1	39	3.16	+1.07	1.27	0	13	12	8	sw.		
Flint.	Genesee.	730	22	43.8	-0.6	76 ^a	28	19	1	40 ^a	2.24	0.00	0.85	0	10	13	6	11	s.	
Frankfort.	Benzie.	589	7	41.2	.....	64	27	18	1	27	0.95	.....	0.40	4.0	5	20	4	10	nw.
Ganges.	Allegan.	665	2	43.8	.....	72	27	17	1	28	4.77	.....	1.03	1.0	13	16	4	10	sw.
Gaylor.	Otsego.	1,367	6	78	26	.....	.....	.....	.....	.....	.....	.....	.....	1.5	.....	16	0	14	Geo. R. Musk Power Co.
Gladwin.	Gladwin.	794	15	42.3	-2.1	80	27	5	2	43	1.20	+0.15	0.28	2.0	7	20	4	6	Geo. R. Smith.	
Grand Haven.	Ottawa.	628	30	42.8	+1.2	70	27	17	1	28	5.53	+3.09	2.19	1.3	13	19	12	9	U. S. Weather Bureau.	
Grand Rapids.	Kent.	707	23	45.8	-0.4	77	27	19	1	29	4.20	+1.75	1.77	0.6	14	10	9	11	Do.	
Grape.	Monroe.	625	21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Joseph W. Morris.	
Grass Lake.	Jackson.	989	5	41.7	.....	68	30	15	1	30	2.00	.....	0.80	T.	9	13	2	15	sw.
Grayling.	Crawford.	1,147	21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6	20	2	8	n.	
Harbor Beach.	Huron.	685	23	40.3	-0.7	70	28	8	2	40	1.35	-0.42	0.60	6	20	2	8	Pere Marquette Ry.		
Harrison.	Clare.	1,159	18	43.1	.....	76	27	18	6	34	1.86	.....	0.78	4.0	4	24	1	5	sw.
Harriville.	Alcona.	616	27	36.8	-2.3	69	28	7	1	31	2.67	-0.10	0.70	6.1	7	14	8	8	sw.	
Hart.	Oceana.	688	19	37.8	-7.6	65	26	17	1	24	1.10	+1.70	2.00	2.0	4	15	7	8	sw.	
Hayes.	Huron.	620	21	43.6	+0.2	76	27	13	2	36	1.60	-0.59	0.45	1.5	6	18	3	9	sw.	
Highland.	Oakland.	830	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7	.....	.....	.....	.....
Hillsdale.	Hillsdale.	1,150	14	45.0	-0.4	71	27	18	2	33	2.34	-0.16	0.83	0.5	8	12	4	14	se.	
Holland.	Ottawa.	610	5	43.2	.....	67	13 ^a	19	1	28	5.41	.....	1.80	T.	15	4	22	4	nw.
Howell.	Livingston.	924	19	44.6	-0.4	76	27	16	1	38	3.50	+1.22	0.85	T.	10	14	6	10	sw.	
Ivan.	Kalkaska.	22	23	39.5	-2.0	75	27	3	2	40	0.80	-1.38	0.27	6.5	10	12	11	7	nw.	
Jackson.	Jackson.	927	14	45.9	-0.8	79	27	17	2	36	2.57	+0.52	1.16	T.	12	15	8	7	n.	
Jeddo.	St. Clair.	667	22	42.2	-0.8	75	27	10	1	32	1.79	-0.24	0.45	T.	8	11	7	12	ne.	
Kalamazoo.	Kalamazoo.	955	35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	Kalamazoo Asylum.	
Lansing (Agr. College).	Ingham.	820	47	44.3	-1.3	75	27	10	1	33	2.11	-0.31	0.79	0.5	15	11	5	14	se.	
Lansing (capitol).	.....	881	24	44.9	-0.9	76	27	17	1	33	2.23	-0.17	0.74	0.1	12	5	15	sw.	
Lapeer.	.....	827	12	44.0	-0.1	78	27	13	1	38	1.62	+0.03	0.50	T.	7	8	14	8	sw.
Ludington.	Mason.	586	13	41.9	+0.7	65	27	19	1	32	1.43	-0.54	0.70	2.0	4	21	3	6	w.	
Luther.	Lake.	1,028	1	41.6	.....	76	27	7	2	42	3.47	.....	1.04	0.6	14	14	8	8	sw.
Mackinaw.	Cheboygan.	593	15	39.6	-0.4	64	27 ^a	9	1	30	2.03	.....	0	0	18	6	6	se.	
Mancelona.	Antioch.	1,121	32	39.2	-2.1	76	27	7	2	46	0.81	-1.05	0.80	8.0	2	17	12	6	se.	
Manistee.	Midland.	600	14	42.1	-1.4	72	27	17	2	36	2.69	+0.52	0.84	6.0	5	19b	5b	4b	nw.	
Midland.	Midland.	604	12	45.0	+0.4	80	27 ^a	15	2	39	0.30	-1.53	0.20	T.	2	14	13	4	s.	
Morenci.	Lemawee.	811	46	46.2	.....	74	30	20	1	39	4.03	.....	1.92	0.1	12	12	3	15	sw.
Mount Clemens.	Macomb.	615	11	41.2	-3.8	77	29	9	1	46	2.34	+1.13	0.80	T.	9	11	9	10	se.	
Mount Pleasant.	Isabella.	826	13	43.6	-1.8	77	27	10	1	48	0.16	-2.00	0.18	T.	1	17	3	10	w.	
Muskegon.	Muskegon.	587	15	43.0	-1.0	67	27	20	1	38	2.00	+1.29	0.60	1.0	8	13	3	14	se.	
Old Mission.	Grand Traverse.	858	17	40.4	-2.3	76	27	14	2	35	1.57	-0.45	0.53	5.4	7	14	5	14	se.	
Olivet.	Eaton.	934	21	42.8	-1.6	73	27	17	1	39	2.72	+0.12	0.70	0.1	12	14	2	14	n.	
Omer.	Arenac.	616	12	42.8	+1.0	75	27	12	3	26	1.00	-1.07	0.80	2.0	2	8	13	9	n.	
Onaway.	Presque Isle.	826	8	38.8	-2.8	76	27	8	1	38	2.70	+1.07	0.00	6.0	5	17	0	13	n.	
Owasso.	Shiawassee.	731	14	47.6	+4.4	77	28	19	1	37	2.29	-0.18	0.50	T.	10	10 ^a	10 ^a	10 ^b	sw.	
Petroskey.	Emmet.	660	21	40.0	-0.5	75	27	10	1	32	0.55	-1.28	0.20	1.0	4	8	14	8	w.	
Plymouth.	Wayne.	725	14	44.5	-1.2	75	30	20	9	42 ^c	.....	.....	.....	.....	10	16	7	7	sw.
Pontiac.	Oakland.	935	11	44.4	-2.5	73	27	18	1	38	3.31	+0.43	0.82	T.	10	16	7	7	sw.	
Port Austin.	Huron.	613	14	36	42.4	+0.2	72	27	15	1	29	1.72	-0.35	0.59	T.	11	12	7	11	nw.
Port Huron.	St. Clair.	639	36	42.4	+0.2	72	27	15	1	29	1.72	-0.35	0.59	2.5	4	19	1	1	sw.	
Reed City.	Oscoda.	1,033	14	37.2	.....	72	18	7	3	45	2.33	.....	1.03	7.6	7	12	11	7	sw.
Roscommon.	Roscommon.	1,141	7	37.2	.....	81	28	17	3	36	2.43	.....	0.77	0.5	9	10	3	7	sw.
Saginaw.	Saginaw.	601	9	45.8	.....	81	28	17	1	38	3.32								

TABLE 1.—Climatological data for April, 1911. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Sky.	Prevailing wind direction.	Observers.		
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmeted.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of partly cloudy days.			
Ohio—Continued.																				
Defiance.	712	17	45.6	— 3.5	73	27	17	2	41	3.51	+ 0.80	1.60	1.5	12	13	4	13	se.		
Findlay.	776	22	47.6	— 1.6	75	24 ^a	19	2	44	3.88	+ 1.01	1.08	5.0	16	17	5	5	se.		
Fremont.	638	9	48.0	— 1.0	74	28 ^a	20	2	37	3.72	—	1.72	0.5	11	10	10	10	ne.		
Hedges.	725	17	47.0	— 1.9	84	30	15	1	42	4.88	+ 2.25	1.87	3.0	10	13	8	9	sw.		
Hillhouse.	997	18	43.7	— 1.1	74	28	8	1	38	4.39	+ 1.71	0.71	1.2	13	9	11	10	sw.		
Hiram.	1,260	31	45.6	— 0.9	71	67	16	2	32	3.64	+ 0.61	0.76	1.5	13	6	12	12	nw.		
Hudson.	1,153	50	45.8	— 0.7	76	28	12	2	37	4.65	+ 1.95	0.85	1.5	14	9	7	7	n.		
Lima.	875	12	47.6	— 0.8	73	28 ^a	20	2	35	3.83	+ 0.39	1.04	2.0	8	11	2	7	nw.		
Medina.	944	23	45.8	— 1.7	74	45 ^a	13	2	43	3.83	+ 0.69	1.00	2.0	12	8	7	15	s.		
Montpelier.	880	19	46.7	— 1.0	74	30	16	2	40	3.78	+ 0.71	2.00	—	8	12	5	13	n.		
Napoleon.	680	24	47.2	— 1.3	72	27	19	2	37	3.41	+ 0.74	1.40	2.0	13	12	2	16	ne.		
New Bremen.	1,038	18	48.2	— 1.6	75	30	22	2	35	3.31	+ 0.75	0.65	4.0	10	10	7	13	sw.		
Osgood.	Cuyahoga.	1,000	18	44.9	— 2.1	71	67	13	1	31	3.61	+ 1.87	1.05	2.0	11	11	9	10	ne.	
North Royalton.	Huron.	719	25	46.0	— 1.3	75	28 ^a	17	2	43	4.00	+ 1.54	1.43	1.0	17	12	9	9	w.	
Oberlin.	Lorain.	855	36	46.0	— 1.3	75	6	15	1	42	3.18	+ 0.57	0.95	—	12	7	5	18	ne.	
Ottawa.	Putnam.	720	16	47.4	— 2.2	73	26 ^a	11	1	39	3.84	+ 1.01	1.30	—	11	1	14	15	nw.	
Sandusky.	Erie.	639	34	46.8	— 0.5	72	6	22	1	34	3.46	+ 0.91	1.66	1.5	13	11	4	15	e.	
Tiffin.	775	28	47.2	— 1.6	73	30	22	2	33	3.98	+ 1.12	1.64	1.5	16	10	10	10	sw.		
Toledo (1).	Lucas.	769	40	47.2	— 0.1	73	30	22	1	32	4.16	+ 1.88	2.24	0.4	14	13	6	12	s.	
Toledo (2).	do.	606	7	46.6	—	72	28 ^a	21	1	39	3.23	—	1.51	T.	15	11	7	12	ne.	
Upper Sandusky.	Wyandot.	854	28	47.3	— 2.6	74	6	17	1	38	5.82	+ 2.92	1.30	8.5	18	6	13	11	sw.	
Vickery.	Sandusky.	588	18	46.3	— 1.4	75	29	20	2	41	3.77	+ 1.21	1.69	1.6	14	8	9	13	ne.	
Wauseon.	Fulton.	780	39	45.7	— 1.4	73	30	19	1 ^a	39	4.03	+ 0.97	2.22	3.1	17	10	8	12	s.	
Wellington.	Lorain.	856	17	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Willoughby.	Lake.	649	17	—	—	—	—	—	—	—	3.61	+ 1.48	0.99	1.1	16	11	8	11	n.	
Pennsylvania.																				
Erie.	Erie.	658	38	44.6	— 0.1	73	27	20	3	36	2.47	+ 0.07	.91	2.3	13	10	10	10	w.	
New York.																				
Adams Center.	Jefferson.	540	20	43.4	+ 3.3	80	29	8	2	36	1.43	— 1.22	.24	3.0	8	15	10	5	w.	
Angelica.	Allegany.	1,340	28	41.0	— 2.3	79	26	9	3	34	1.83	— 1.09	.45	9.0	10	7	4	19	sw.	
Appleton.	Niagara.	270	20	43.2	— .9	71	30	21	2	32	0.69	— 1.59	.25	5	6	15	9	6	nw.	
Auburn.	Cayuga.	715	42	44.6	— 4	81	29	16	3	36	1.61	— .91	.57	3.0	8	23	5	2	n.	
Avon.	Livingston.	585	16	44.6	— 3	78	26 ^a	14	2	35	1.10	— .99	.50	3.0	6	15	10	5	—	
Blue Mountain Lake.	Hamilton.	1,750	11	—	—	—	—	—	—	—	1.07	— 1.78	.57	7.0	5	19	2	9	w.	
Brockport.	Monroe.	537	15	44.2	— 4	77	30	13	3	33	1.00	— 1.85	.20	2.0	11	10	16	4	w.	
Buffalo.	Erie.	767	60	42.8	+ .5	70	27	18	1	30	1.65	— .80	.53	7	13	8	9	13	sw.	
Canton.	St. Lawrence.	448	17	40.7	— 1.8	80	29	1	3	34	1.08	— 1.18	.36	2.0	6	13	8	9	ne.	
Cape Vincent.	Jefferson.	246	6	39.4	—	73	30	7	3	29	1.06	—	.48	—	5	17	8	5	s.	
Carvers Falls.	Washington.	243	13	41.4	— 1.5	81	30	7	1	44	0.61	— 1.77	.41	2.0	2	21	5	4	n.	
Chazy.	Clinton.	151	11	41.0	— 1.5	83	29	3	4	42	0.33	— 1.25	.20	3.0	3	17	7	6	s.	
Dannemora.	do.	1,490	6	40.1	—	79	29	3	2	33	0.74	—	.47	3.2	6	15	6	9	w.	
Elba.	Genesee.	500	12	42.4	— 2	76	28	12	3	33	1.30	— 1.84	.45	3.0	5	17	6	7	nw.	
Fayetteville.	Onondaga.	530	10	45.3	± .0	86	29	3	3	38	1.23	— 1.82	.30	3.5	7	14	8	8	w.	
Faust.	Franklin.	1,550	35	39.9	—	73	29	—	3	36	0.73	—	.27	6	6	15	6	9	—	
Gabriels.	Washington.	1,729	9	36.0	—	79	29	—	3	47	0.80	—	.23	4.5	6	18	9	3	nw.	
Harkness.	Clinton.	622	9	40.4	— 1.2	82	30	5	4	35	0.56	— 1.12	.29	5.0	3	27	2	1	w.	
Hemlock Lake.	Livingston.	900	13	41.9	— 2.0	74	28 ^a	14	3	35	1.59	— .97	.60	2.0	6	15	8	7	nw.	
Hunt.	do.	1,321	12	44.2	— 3	83	28	10	3	39	1.82	— 1.14	.39	2.0	9	6	19	5	ne.	
Ithaca.	Tompkins.	928	33	44.4	— 2	82	28	16	2	39	2.05	— 2.24	.42	6.3	17	10	9	11	nw.	
Keene Valley.	Essex.	1,000	13	40.1	— 1.8	85	28 ^a	—	1	40	1.68	— 1.04	.47	9.0	10	19	8	3	nw.	
King Ferry.	Cayuga.	11	—	—	—	—	—	—	—	—	1.92	— .66	.36	3.2	9	15	6	9	se.	
Lake George.	Warren.	350	14	42.4	— 1.3	84	29	5	2	44	1.07	— 1.66	.06	2.3	5	14	12	4	ne.	
Lake Placid Club.	Essex.	1,864	31	31.3	— 70	29	—	10	4	43	1.95	—	.35	7.0	9	18	8	6	nw.	
Le Roy.	Genesee.	920	21	44.4	+ 1.0	80	28	15	3	37	1.39	— 1.67	.24	3.4	12	10	5	15	sw.	
Lockport.	Niagara.	650	24	43.4	— 2.3	76	29	15	3	31	0.75	— 1.48	.17	2.5	10	13	3	14	sw.	
Lowville.	Lewis.	900	44	38.7	— 3.9	81	29	5	3	42	1.41	— .83	.75	5	17	6	7	n.		
Mohra.	Franklin.	200	11	41.8	— 1.8	80	29	5	4	35	1.09	— 1.39	.30	9.0	6	17	11	2	w.	
Nehasane.	Herkimer.	1,750	3	33.9	—	77	28	—	12	3	50	2.48	—	.70	12.5	13	12	5	n.	
North Lake.	do.	1,822	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Ogdensburg.	St. Lawrence.	175	27	41.0	— 3.1	78	29	5	3	35	1.16	— .93	.60	T.	4	18	8	4	s.	
Old Forge.	Herkimer.	1,733	3	35.8	—	78	29	—	9	3	47	1.33	—	.60	4.5	7	7	9	s.	
Oswego.	Oswego.	335	41	42.4	— 8	73	30	—	20	2	26	1.79	— .47	.48	2.1	10	11	5	14	s.
Palermo.	Cattaraugus.	1,410	7	—	—	—	—	—	—	—	1.57	— .63	.40	6.5	11	19	4	7	nw.	
Perry City.	Schuyler.	1,038	31	41.5	— 1.6	77	27 ^a	7	3	42	2.57	— .18	.06	6.1	12	7	9	14	nw.	
Philadelphia.	Jefferson.	485	5	41.8	—	79	28 ^a	0	3	35	1.42	—	.53	T.	5	10	7	3	w.	
Potsdam.	St. Lawrence.	300	35	41.6	— 1.7	83	30	0	3	41	1.31	— .55	.48	—	7	14	9	14	s.	
Rochester.	Hamilton.	523	3	35.2	— 5	76	28	—	5	4	44	1.70	— 6.4	.41	6.8	8	13	4	nw.	
Romulus.	Monroe.	719	19	—	—	—	—	—	—	—	1.80	— 6.4	.34	4.7	12	9	8	13	w.	
Shortsville.	Seneca.	740																		

TABLE 2.—*Daily precipitation for April, 1911. District No. 4, Lake Region.*

TABLE 2.—*Daily precipitation for April, 1911. District No. 4—Continued.*

TABLE 2.—*Daily precipitation for April, 1911. District No. 4—Continued.*

* Precipitation included in that of the next measurement.

† Separate dates of falls not recorded.

Precipitation for the 24 hours ending on the morning when it is measured.

T. Precipitation is less than 0.01 inch rain or melted snow.

TABLE 3.—Maximum and minimum temperatures at selected stations for April, 1911. District No. 4, Lake Region.

Date.	Duluth, Minn.	Wisconsin.						Chicago, Ill.	Fort Wayne, Ind.	Michigan.													
		Florence.		Green Bay.		Milwaukee.				Escanaba.		Ewen.		Houghton.		Mar- quette.		Sault Ste. Marie.		Alpena.		Battle Creek.	
		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1....	28	3	26	5	32	15	36	20	34	27	37	24	29	8	30	3	25	15	25	11	19	32	19
2....	25	17	31	4	32	23	32	26	35	29	38	21	30	13	32	2	24	11	23	10	32	33	21
3....	30	22	35	9	36	25	37	30	38	32	37	28	33	8	28	6	34	10	33	11	31	16	40
4....	30	27	34	24	33	30	35	32	39	33	47	32	33	23	29	20	32	27	31	25	33	29	30
5....	34	26	35	27	36	32	40	34	45	36	59	39	40	31	28	20	34	29	35	29	40	33	36
6....	29	18	37	27	38	28	38	30	41	33	69	40	41	27	40	22	34	28	37	27	35	27	36
7....	39	15	40	18	40	22	38	25	37	29	46	27	39	23	45	26	35	23	32	23	38	21	45
8....	34	29	41	24	44	31	42	31	39	34	44	29	38	27	44	28	41	19	41	25	39	24	41
9....	48	28	53	22	48	28	44	32	42	35	55	25	41	30	52	35	45	24	41	25	42	24	53
10....	47	34	52	26	53	34	44	36	49	39	60	21	42	39	55	25	55	28	49	30	43	25	56
11....	49	36	55	29	57	37	50	59	41	67	32	47	34	58	33	54	33	50	33	47	31	44	34
12....	45	37	45	35	51	41	49	39	60	43	63	47	40	35	58	41	49	39	47	38	40	37	43
13....	45	30	62	39	62	43	65	44	68	53	61	52	60	38	52	38	64	35	64	38	45	37	60
14....	49	27	49	31	53	34	53	37	55	40	60	44	52	33	46	23	43	28	42	31	48	38	59
15....	44	25	47	25	43	31	48	35	53	39	59	38	40	29	38	15	36	30	35	28	36	27	45
16....	47	24	42	22	50	30	51	36	54	37	56	31	42	24	40	13	39	26	34	27	35	25	41
17....	53	33	64	22	60	30	48	34	55	40	62	28	40	25	68	26	57	26	28	47	23	45	26
18....	53	35	73	31	67	42	68	43	64	52	64	34	53	34	72	35	69	36	64	39	51	29	47
19....	48	35	60	41	48	39	49	41	55	45	57	52	52	37	58	33	55	37	51	33	50	34	57
20....	60	38	56	30	59	39	56	41	56	44	64	42	53	34	51	34	44	36	54	36	55	37	64
21....	49	34	50	34	50	36	49	40	54	42	60	43	46	33	48	25	45	34	42	35	51	34	48
22....	48	29	51	27	50	33	50	35	49	39	55	35	46	34	52	19	43	32	44	34	49	34	56
23....	52	34	.....	52	53	32	47	35	47	39	57	31	50	33	54	19	51	29	46	33	51	33	53
24....	57	32	63	27	59	34	52	36	51	41	64	52	52	32	65	22	57	30	47	35	53	32	60
25....	59	35	68	31	64	37	54	40	53	45	67	33	51	35	70	24	64	31	53	41	64	36	65
Mns.	46.0	30.3	61.7	28.0	51.3	34.6	48.7	36.1	51.5	40.7	58.9	36.7	45.5	30.3	51.0	25.4	48.5	30.1	46.2	31.6	47.2	28.8	46.2

Date.	Michigan.						Ohio.						New York.						Vermont.					
	Detroit.	Muskegon.	Saginaw, West Side.	Cleveland.		Lima.		Sandusky.		Toledo.		Erie, Pa.	Buffalo.		Canton.		Rochester.		Syracuse.		Burlington.		Northfield.	
				Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
1....	27	21	32	20	29	17	31	23	38	24	32	22	33	22	30	23	27	18	25	14	27	19	27	18
2....	34	20	32	20	34	17	32	21	37	20	36	22	40	24	30	20	25	12	27	19	27	16	25	10
3....	36	25	39	23	36	18	38	25	37	29	35	28	33	27	34	20	34	21	33	1	33	20	27	
4....	52	31	36	30	35	27	55	35	56	33	56	34	58	33	45	29	38	29	40	9	40	24	36	
5....	54	40	40	34	53	34	61	43	61	43	62	43	60	42	65	40	57	36	54	31	64	44	57	
6....	68	35	37	33	40	33	73	35	72	40	75	32	69	36	71	35	65	35	62	37	69	41	54	
7....	44	31	34	30	43	27	38	33	45	25	40	33	45	30	38	34	33	30	50	32	45	31	54	
8....	40	32	38	29	39	29	41	31	44	25	38	34	40	31	38	29	42	28	38	27	41	28	39	
9....	45	29	45	30	53	25	39	32	59	27	45	32	46	28	42	30	44	28	45	29	32	37	24	
10....	54	35	53	25	57	28	48	33	57	44	48	34	52	34	48	33	47	29	44	23	48	32	41	
11....	58	37	63	37	62	34	61	40	63	37	62	38	58	37	61	39	56	34	44	23	52	36	51	
12....	50	41	59	43	53	42	51	44	57	46	54	46	55	44	53	42	54	39	56	32	45	34	54	
13....	56	48	61	50	59	49	64	51	68	50	59	52	63	46	60	46	62	44	63	38	59	54	58	
14....	57	39	50	37	58	43	60	41	60	44	60	43	58	43	60	41	57	34	57	39	58	51	52	
15....	46	32	45	35	44	31	48	34	58	39	50	34	51	32	43	33	53	32	53	34	54	37	51	
16....	45	31	42	32	50	24	42	33	52	34	44	31	52	33	40	32	35	29	35	29	40	28	39	
17....	51	32	45	30	53	26	43	35	56	30	48	36	54	32	41	32	38	30	36	24	40	39	40	
18....	65	38	61	38	71	36	63	34	63	39	63	37	64	40	61	31	55	30	50	26	54	29	46	
19....	54	46	59	50	61	45	58	41	54	40	56	42	55	43	58	39	60	44	55	38	55	28	53	
20....	60	45	52	40	58	36	50	40	57	42	55	43	59	42	50	37	55	39	51	31	52	38	52	
21....	53	38	50	37	56	42	47	42	54	42	56	42	48	39	44	35	48	25	46	40	50	35	48	
22....	50	33	48	35	52	34	47	37	45	38	51	34	39	36	40	35	49	32	41	31	40	27	45	
23....	51	33	50	34	51	35	45	38	54	32	48	40	50	34	46	36	49	35	47	30	46	33	45	